

**Improved analysis of COMPTEL solar neutron data,  
with application to the 15 June 1991 flare**

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Direct solar flare neutrons are a valuable diagnostic of high-energy ion acceleration in these events, and COMPTEL improves over all previous cosmic neutron detectors in its capacity for neutron energy measurement. Previous studies of COMPTEL neutron data have worked with an incomplete model of the instrumental response, applying energy-by-energy detection efficiencies. Ignoring off-diagonal elements of the response matrix in this way essentially underestimates the overall detector efficiency. Here we employ statistical regularisation techniques with the full (Monte Carlo simulation derived) response matrix to produce improved estimates of neutron numbers and energy distribution. These techniques are applied to data from the well-observed 15 June 1991 flare. We find that the data imply an incident neutron flux 73% of the previously inferred value. Implications for the picture of primary ion acceleration in this flare are briefly discussed.